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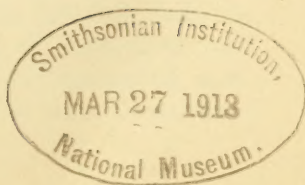
FIELD OBSERVATIONS ON SUGAR-CANE INSECTS
IN THE UNITED STATES IN 1912.

BY

T. E. HOLLOWAY,
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United States Department of Agriculture,

BUREAU OF ENTOMOLOGY.

L. O. HOWARD, Entomologist and Chief of Bureau.

FIELD OBSERVATIONS ON SUGAR-CANE INSECTS IN THE UNITED STATES IN 1912.

By T. E. HOLLOWAY,
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INTRODUCTION.

The results here presented are based on the records of field observations made during the year 1912. Though the information on any one insect is fragmentary at best, it has been thought desirable to issue this report for the reason that so little is definitely known concerning insects affecting sugar cane in the United States that even a very incomplete treatment of the subject is a contribution to the current knowledge.

A survey of the sugar-cane areas of Louisiana and Texas was undertaken during the year, and this work has been supplemented by some observations made in Mississippi and Alabama. In subsequent reports more attention will be given to the States last mentioned, as well as to Georgia and Florida, but the press of other work in the past has rendered it impossible to give these States the attention they deserve.

Credit and the thanks of the writer are due to Mr. E. R. Barber, of this bureau, for making a number of field examinations, mainly the final observations in northern Louisiana and those in Mississippi and Alabama.

THE SUGAR-CANE MOTH BORER.

(*Diatraea saccharalis* Fab.)

Special attention was given to the determination of the percentage of infestation of the moth borer, this being the principal insect injurious to sugar cane in this country. The plan adopted was to examine 125 stalks of sugar cane in a field, choosing the stalks in 5 different groups of 25 stalks each. The uninfested and the infested stalks in these groups were counted, and the percentage of infestation was determined from this data. In actual practice this proceeding was changed to some extent. More than 125 stalks were sometimes

examined, and sometimes it seemed preferable to examine 75 stalks in each of two fields rather than to concentrate the work on one field. The number of fields examined in one vicinity varied from one to four, depending on the amount of time at the disposal of the inspector. The infestation of the moth borer seems to be fairly uniform in a given district, and it is believed that the results obtained give a good idea of the relative infestation by the insect.

Examinations were made from May 24 to November 26, 1912. It was difficult to determine the full infestation of the moth borer during the first part of the season, however, and in the table which follows the results for October and November only are given. Early in the season the cane can hardly be carefully examined without damaging the plant, and the infestation of the moth borer is then small compared to the infestation that may be expected later. The dates of inspection are given in the table because the infestation seems normally to increase until the cane is cut. Thus the infestation of a certain field would probably be greater on November 1 than on October 1. Comparisons of the different percentages can be made more accurately if this is kept in mind.

Table showing the percentage of sugar cane infested by the moth borer at various places in the Southern States in 1912.

State.	Near town or city of—	Parish or county.	Date of inspection.	Per cent of infestation.
Louisiana.....	Alexandria.....	Rapides.....	Nov. 8	0
	Baton Rouge.....	East Baton Rouge.....	Oct. 29	78
	Bunkie.....	Avoyelles.....	Nov. 7	0
	Donaldsonville.....	Ascension.....	Oct. 28	56
	do.....	Assumption.....	do.....	59
	Franklin.....	St. Mary.....	Oct. 31	47
	La Fayette.....	Lafayette.....	Oct. 30	57
	Morgan City.....	St. Mary.....	Nov. 1	4
	New Orleans.....	Orleans.....	Oct. 17	59
	Ruston.....	Lincoln.....	Nov. 11	0
	Shreveport.....	Caddo.....	Nov. 12	0
	Brownsville.....	Cameron.....	Oct. 7	62
	Donna.....	Hidalgo.....	Oct. 8	99
	Harlingen.....	Cameron.....	Oct. 9	65
Texas.....	San Benito.....	do.....	Nov. 13	61
	Sugar Land.....	Fort Bend.....	Oct. 12	0
	Victoria.....	Victoria.....	Oct. 11	0
	Biloxi.....	Harrison.....	Oct. 27	0
Mississippi.....	Brookhaven.....	Lincoln.....	Nov. 15	0
	Hattiesburg.....	Forest.....	Oct. 24	0
	Jackson.....	Hinds.....	Nov. 14	0
Alabama.....	Montgomery.....	Montgomery.....	Oct. 26	0
	Selma.....	Dallas.....	do.....	0

The foregoing table indicates that the infestation of the moth borer varies from 99 per cent (or practically all canes infested) at a point in the Rio Grande Valley in Texas to 0 per cent (or no canes infested) at places in northern Louisiana, Alabama, and Mississippi, and even at Sugar Land and Victoria, Tex. At Victoria our notes are corroborated by Mr. J. D. Mitchell, a resident agent of the Bureau of Entomology, and planters near there are entirely unfamiliar with the moth

borer. Cane has been grown for years at Victoria for sirup making, and it is unlikely that any new varieties have been introduced there in a generation.

It seems evident from these examinations that the moth borer has never entered certain restricted districts, while it has probably been imported with shipments of seed cane to places where an effort has been made to obtain new and better varieties of cane. The presence of the moth borer in Louisiana is accounted for by the belief that it was introduced in shipments of sugar cane from the Tropics, while its presence in the Rio Grande Valley is probably due to accidental introductions from Louisiana or Mexico, provided it is not native to that part of Texas. However this may be, the moth borer is evidently absent from the sirup-producing regions of Texas and Louisiana, where sugar cane is grown only as an incidental crop, while the insect is present in the sugar-producing regions (except at Sugar Land) where sugar cane is of vital importance and where new and better varieties are desired and obtained. The results from examinations in Alabama and Mississippi concern sirup-producing communities, and agree with the results from Texas and Louisiana. These findings go to strengthen the position that introductions of sugar cane should be made with great care if injurious insects are to be excluded.

A most noteworthy result of the examinations during the year is the discovery of eggs of the moth borer attacked by the hymenopterous parasite *Trichogramma minutum* (*pretiosa*) Riley, by Mr. Gilbert E. Bodkin, Government economic biologist of British Guiana, South America. Examining sugar cane with the writer at Audubon Park, New Orleans, in September, he found the black egg masses of the moth borer on the leaves of the plants. Being familiar with the work of the parasite in British Guiana he was sure that the eggs were parasitized. Parasites were afterwards reared from the eggs by the writer, and they were found to be of the species mentioned, which occurs in many places in this and other countries. The parasite, however, had not previously been reared from eggs of the moth borer in the United States.

Later the writer found parasitized eggs of the moth borer near Brownsville, Tex., Donna, Tex., Donaldsonville, La., and Franklin, La.

The larvæ of a predaceous beetle were found on sugar cane by Mr. E. R. Barber, near Montgomery, Ala., on October 26, and by the writer near Baton Rouge, La., and La Fayette, La., in October, and near San Benito, Tex., in November. These larvæ were not observed to attack the borer, though they may do so.

Evidences of larval parasites of the borer were detected at a number of places, but these are somewhat doubtful.

THE SUGAR-CANE MEALYBUG.

(Pseudococcus calceolariae Mask.)

The examinations to determine the infestation of the mealybug were made chiefly in connection with the work on the moth borer. The mealybug appeared in small numbers at the experiment station at Audubon Park during the summer of 1912, and by November 26 it was difficult to find a single stalk of the cane then on the fields which was entirely free of the insect. Near Poydras, St. Bernard Parish, La., a few mealybugs were found on one stalk of cane on September 10. On September 12 a small infestation was found in Jefferson Parish, near New Orleans (on St. Martin plantation). The mealybug in fairly large numbers was found by Mr. E. R. Barber at English Turn, Plaquemines Parish, La., on September 24. Near Franklin, La., the writer found a slight infestation on October 31. The green fungus which attacks the mealybug was observed at two places in Orleans Parish, La.

The mealybug was discovered by the writer at Brownsville, Tex., for the first time on October 8. A rather heavy infestation occurred on a limited number of canes of various new varieties at the experiment station. The insect had evidently been brought in with the cane from Louisiana or the Tropics. The infested cane was soon after destroyed by those in charge in an effort to eradicate the mealybug from the experiment station grounds.

It is evident that the mealybug has infested only a limited territory in the United States. Precautions should be taken to prevent its spread to uninfested regions. The problem of the mealybug is complicated in certain parts of Louisiana, where the Argentine ant (*Iridomyrmex humilis* Mayr) also occurs, as the two species are of benefit to each other, and the ant aids in the spread of the mealybug.

THE SUGAR-CANE WEEVIL BORER.

Concerning the weevil borer we quote our remarks in another circular,¹ which are as follows:

A note in the possession of the writer records a weevil as having been reared from young shoots of sugar cane which were collected at Fairview Plantation, Berwick, La., on April 28, 1910, by Mr. D. L. Van Dine. Mr. Van Dine found the larvæ just above the surface of the ground. Mr. E. R. Barber of this office states that he found pupæ of weevils in the sugar cane at Audubon Park, New Orleans, in 1911. During the early summer in 1912 the writer found weevil borers in the young sugar-cane plants at Audubon Park and at the experiment station at Brownsville, Tex. The

¹ Insects Liable to Dissemination in Shipments of Sugar Cane. By T. E. Holloway. Cir. 165, Bur. Ent., U. S. Dept. Agr., 1912.

weevils found at Brownsville were in the larval stage in dying plants of stubble cane, below the surface of the ground, and near the point where the young shoot left the old stubble. In plant cane at Audubon Park the weevil larvæ were also found below the surface, and near the point where the young plant joined the seed cane. The larvæ were from one-eighth to one-fourth of an inch in length. Sometimes a borer was found in the middle of the stem, while in other cases the borers were near one side of the stem. The injury to the plant is like the "dead heart" caused by our moth borer. It seems probable that the moth borer is blamed for some of the injury caused by the weevils.

Very likely these borers have been introduced in shipments of sugar cane from the Tropics. They are small, and their work is hard to find, so that they might easily have escaped the eye of the average person. So few of the weevils have been found up to date that there may be no occasion for alarm, while on the other hand they may increase in numbers so as to become a serious pest.

THE FALL ARMY WORM.

(*Laphygma frugiperda* S. & A.)

Following the wet weather of the spring of 1912 an outbreak of the fall army worm, or southern grass worm, was noticed in the Southern States. Corn, rice, and forage crops suffered more than sugar cane, but one field of cane that came under the writer's observation was ruined by this or a nearly related species. This field was near La Fayette, La., and was examined on July 20, 1912. The land was comparatively low and undrained, thus providing a suitable place for the development of the "grass worm," which prefers a wet soil. The characteristic work of the larvæ was observed, though no larvæ were found. Larvæ, however, were found attacking sugar cane at Audubon Park, New Orleans, during July, 1912.

In most cases it seems that no great injury from this species was suffered by sugar cane, and the plants recovered so completely that in the grinding season the injury was hardly perceptible, and only a few leaves could ordinarily be found showing traces of the work of the larvæ.

THE SUGAR-CANE BEETLE.

(*Ligyrus rugiceps* Lec.)

No definite records have been obtained during the year regarding the sugar-cane beetle, and it is probable that it has done very little damage this season.

May beetles (*Lachnosterna* spp.) are also known to attack sugar cane, but no injury due to them was observed during the year, and very few adults of the beetles were seen at New Orleans.

THE SUGAR-CANE APHIDID.

Winged and wingless forms of a dark brown aphidid, or plant louse, were observed on sugar cane at Audubon Park, New Orleans, on July 29, 1912, and at various times thereafter. They were attended by the Argentine ant in the same way as the mealybug is attended by this species. Very little is known concerning this aphidid. It is found in small colonies on the outside of the leaf axils on the cane plant, and apparently works in a manner somewhat similar to that of the mealybug, though it has been observed on the leaves of the cane rather than on the stalks themselves. In large numbers this species might be injurious to the eyes of cane for planting.

These aphidids were also found near Donaldsonville, La., Franklin, La., Harlingen, Tex., Morgan City, La., and Poydras, St. Bernard Parish, La.

INSECTS OF MINOR IMPORTANCE.

ANTS.

The large red ant of Texas (*Pogonomyrmex barbatus* Smith), usually called the agricultural ant, was recorded during the year as attacking sugar cane. Near Brownsville, Tex., on June 12, the writer observed ants of this species busily gnawing a few young cane plants. The sound they made was similar to that of a gentle shower of rain. The ants had eaten the leaves of plants about 2 feet high, as well as the entire tops of two little plants about one-eighth inch in diameter. This seems to be an exceptional habit on the part of the agricultural ant.

Another species of ant was found nesting in holes in cane stalks made by the moth borer and in the spaces between the leaves and the stalks. This observation was made near Brownsville, Tex., on October 7, 1912.

These ants should not be confused with the Argentine ant, which is of prime importance in its symbiotic relationship with mealybugs, scale insects, and aphidids.

LEAFHOPPERS.

Leafhoppers in very small numbers were observed several times during the season on sugar cane, but no injury due to them could be detected.

FROGHOPPERS.

Mr. Gilbert E. Bodkin and the writer found froghoppers on sugar cane, weeds, and grass near Poydras, St. Bernard Parish, La., on September 10, 1912. The froghoppers start on rank growth and then

transfer their attention to sugar cane. For this reason the fields should be kept free of weeds and tall grass, especially in moist situations, as a humid climate is favorable to the development of these insects.

TERMITES.

The writer found termites or "white ants" in sugar cane which had been cut into pieces of three joints each and planted. On June 12, 1912, when some of the cane was dug up and examined, the shoots from it were apparently weak and some of the eyes had not germinated. The cane was planted near Brownsville, Tex., and had been imported from Porto Rico, but the writer believes that the termites were probably native to this country and that they attacked the cane readily, being attracted by the many cuts. It seems inadvisable from the entomological standpoint to cut cane in small pieces before planting, as many insects may easily gnaw into the stalks through the unprotected ends.

GRASSHOPPERS.

On August 9, 1912, Mr. E. R. Barber found grasshoppers very abundant in the cane fields near Sugar Land, Tex. Many stripped leaves, due to their work, were seen. The writer visited Sugar Land on October 12, but found no grasshoppers at that time. The cane seemed to have recovered from the injury it had suffered earlier in the season from these insects. A grasshopper in the act of gnawing a cane leaf was observed near Baton Rouge, La.

CONCLUSIONS.

The peculiar weather during the season of 1912 probably accounts in part at least for certain unexpected developments in insect life during the year. A long and cold winter was followed in Louisiana by a wet spring. Breaks in the levee of the Mississippi River caused vast areas of land to be flooded, and the excess of water complicated matters further. We find a slow development of the moth borer and the mealybug, which are tropical species and evidently require a greater amount of warm weather than our native insects. As to the sugar-cane beetle, the statement has been made by some planters that this insect does most damage in dry seasons and on high, sandy soils, so that we may believe that the wet weather retarded its development. The fall army worm, or southern grass worm, on the contrary, is more injurious during wet weather, which will account for its extraordinary abundance during the summer of 1912.

Practically no moth borers or mealybugs were found in the district near Morgan City, La., which had been overflowed some months

previous to our observations. This indicates that these insects may possibly be controlled by flooding or excessive irrigation.

Though these inferences are mainly, perhaps, of scientific interest, they may at some time be useful in an economic way. More important from the planter's point of view, however, is the evidence of the uneven distribution of the principal insects which are injurious to sugar cane. It seems that with reasonable caution in the shipment of cane the spread of most species, at least, can be curtailed if not altogether prevented.

The number of species which were detected injuring cane is perhaps surprising, and it is possible that still other species will be discovered as the work progresses. Some of the species are apparently of no great importance, though there is a possibility that the weevil borer and the froghopper, which are now rare, may increase in numbers and become formidable pests. The aphidid, also, which is rather widely distributed, is to be regarded as an insect which may be capable of considerable injury.

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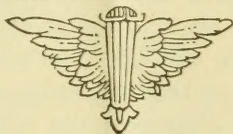
JAMES WILSON,

Secretary of Agriculture.

WASHINGTON, D. C., *January 18, 1913.*

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